FIG.1

I0;ORIGINAL IMAGE DATA

ENCODER 100

BLOCK DIVISION SECTION 101

I1

BLOCK EXTRACTION SECTION 102

Dy

Dm

YELLOW AVERAGING SECTION 103

MAGENTA AVERAGING SECTION 105

Dyl

Dyr

Dml

Dmr

L REGISTER / R REGISTER 104l / 104r

L REGISTER / R REGISTER 106l / 106r

COMPARISON SECTION 107

109

ENCODING SECTION

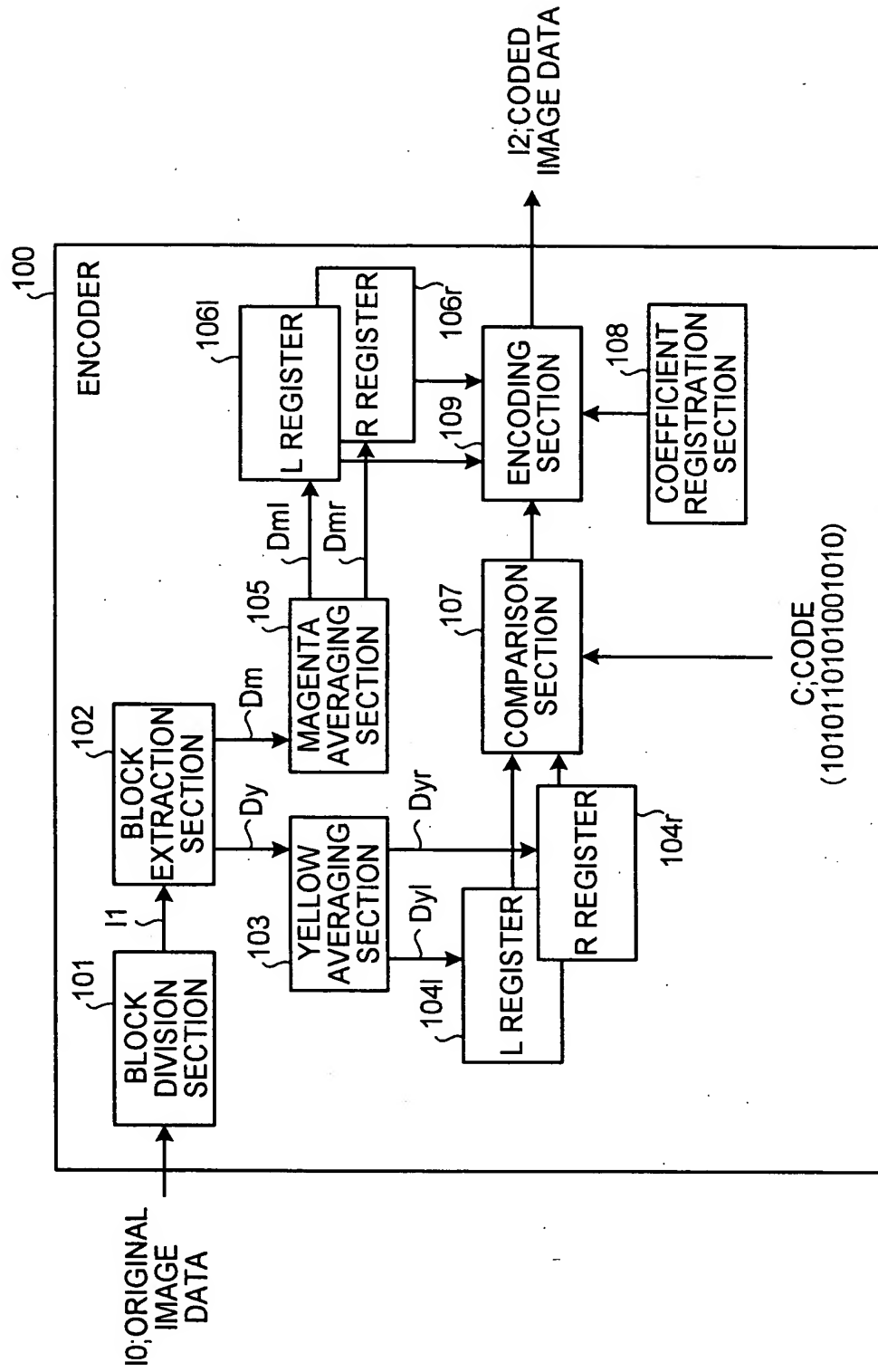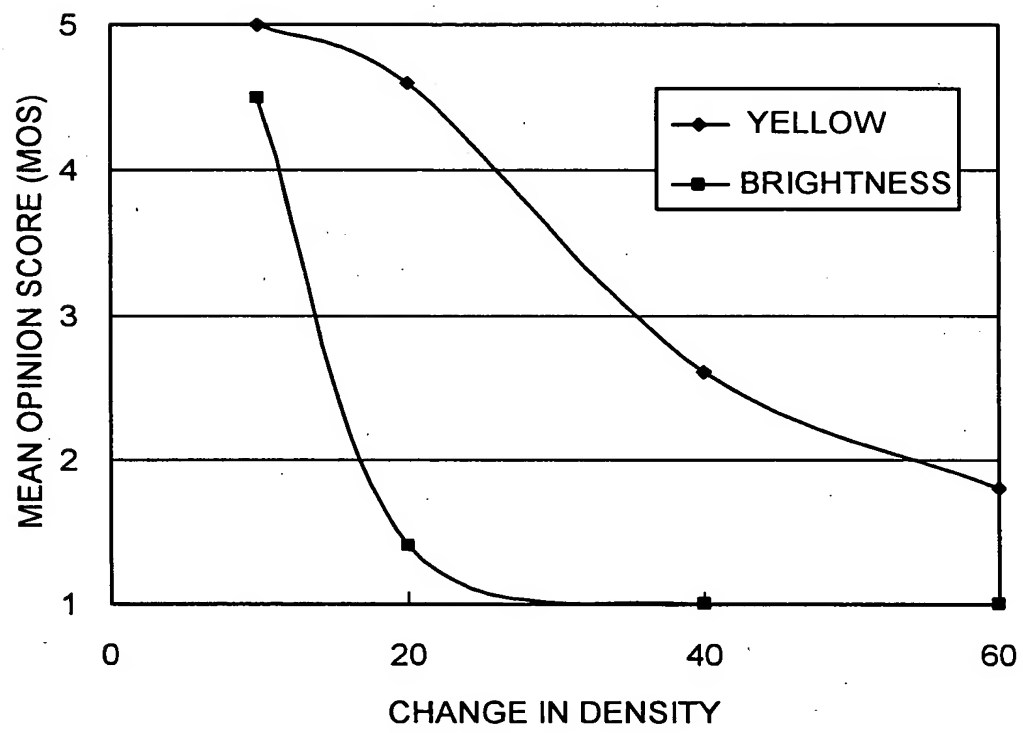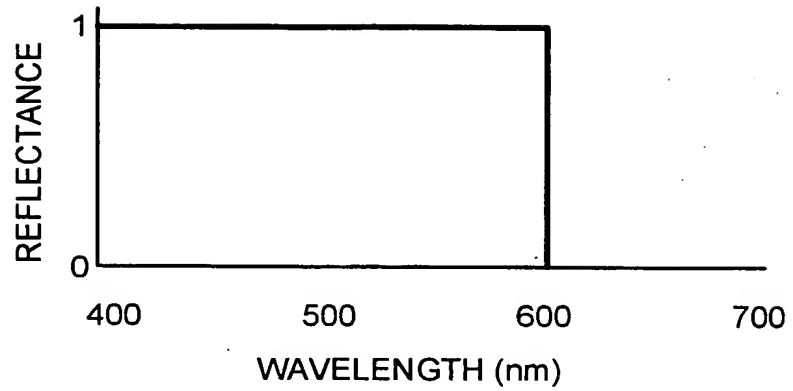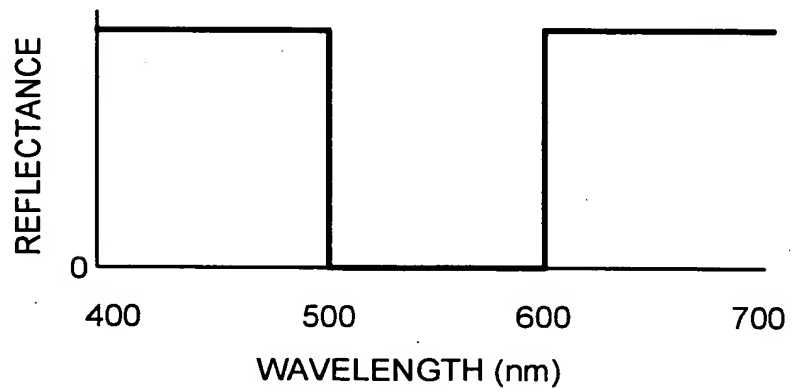COEFFICIENT REGISTRATION SECTION 108

C;CODE (101011010101001010)

I2;CODED IMAGE DATA

FIG.2

FIG.3A

CYAN

MAGENTA

YELLOW

FIG.3B

FIG.4A

YELLOW COMPONENT		MAGENTA COMPONENT		ACTUAL YELLOW COMPONENT
20	+	30	=	21
10	+	30	=	13

FIG.4B

YELLOW COMPONENT		MAGENTA COMPONENT		ACTUAL YELLOW COMPONENT
20	+	30	=	21
10	+	40	=	25

YELLOW COMPONENT		MAGENTA COMPONENT		ACTUAL YELLOW COMPONENT
25	+	30	=	22
5	+	40	=	15

FIG.5

$Dyl < Dyr \rightarrow 0$
$Dyl \geqq Dyr \rightarrow 1$

FIG.6

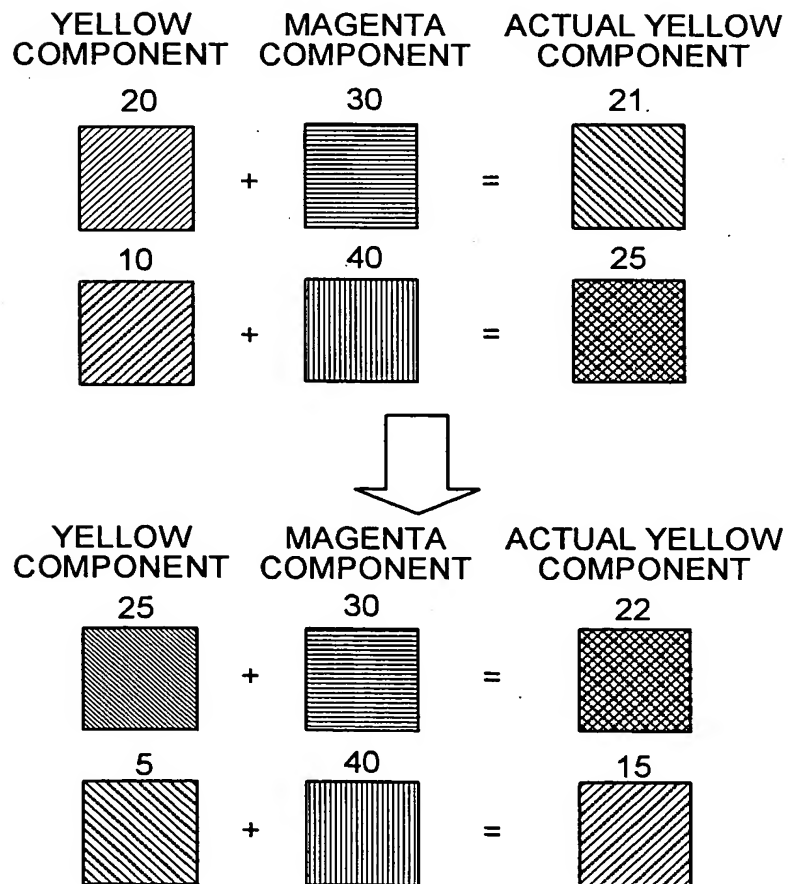|								
	1	0	1	0	1	1	0	1
A_1	0	1	0	0	1	0	1	0
A_2	....							
	....							
	....							
	....							
	....							
	....							
A_8	....							

I_2
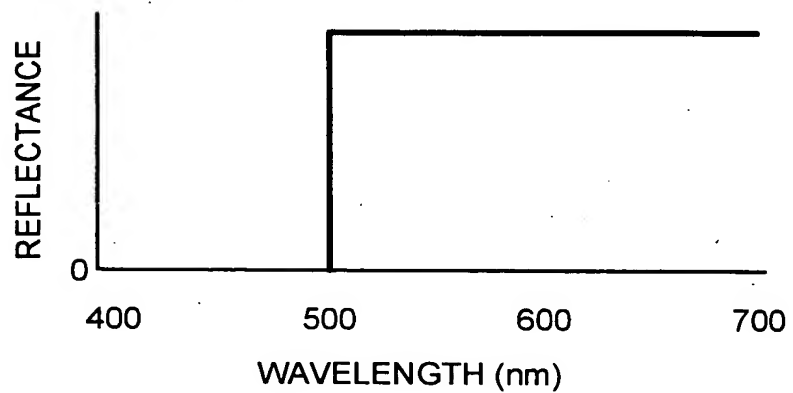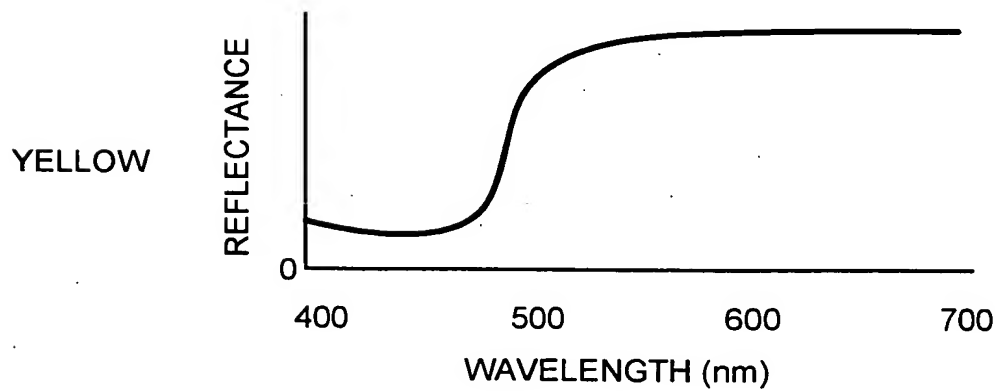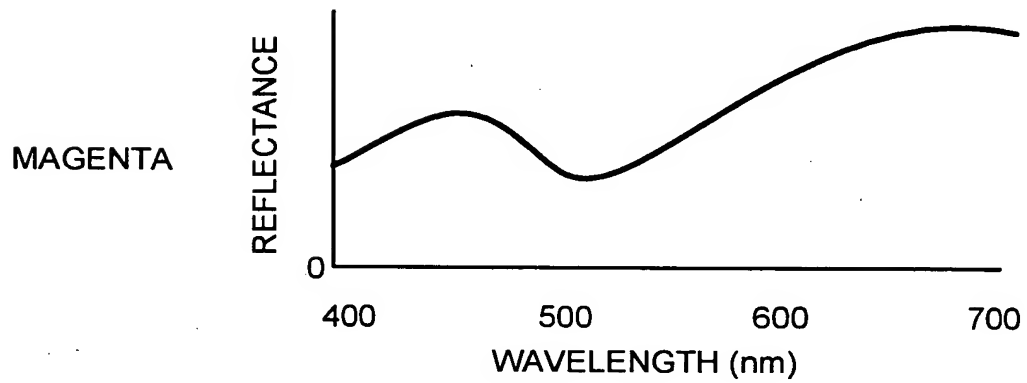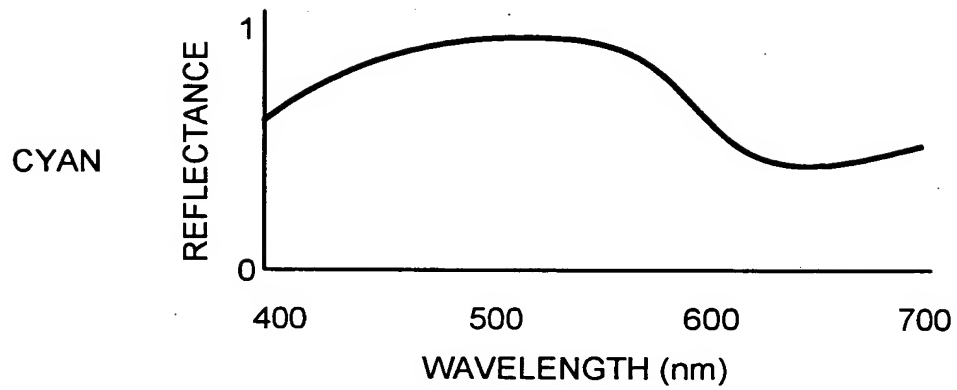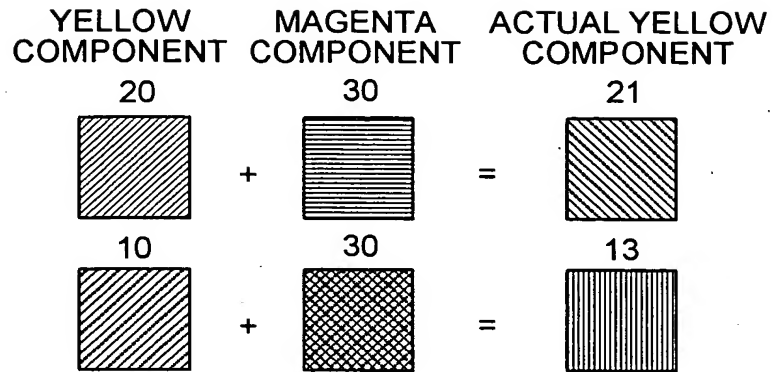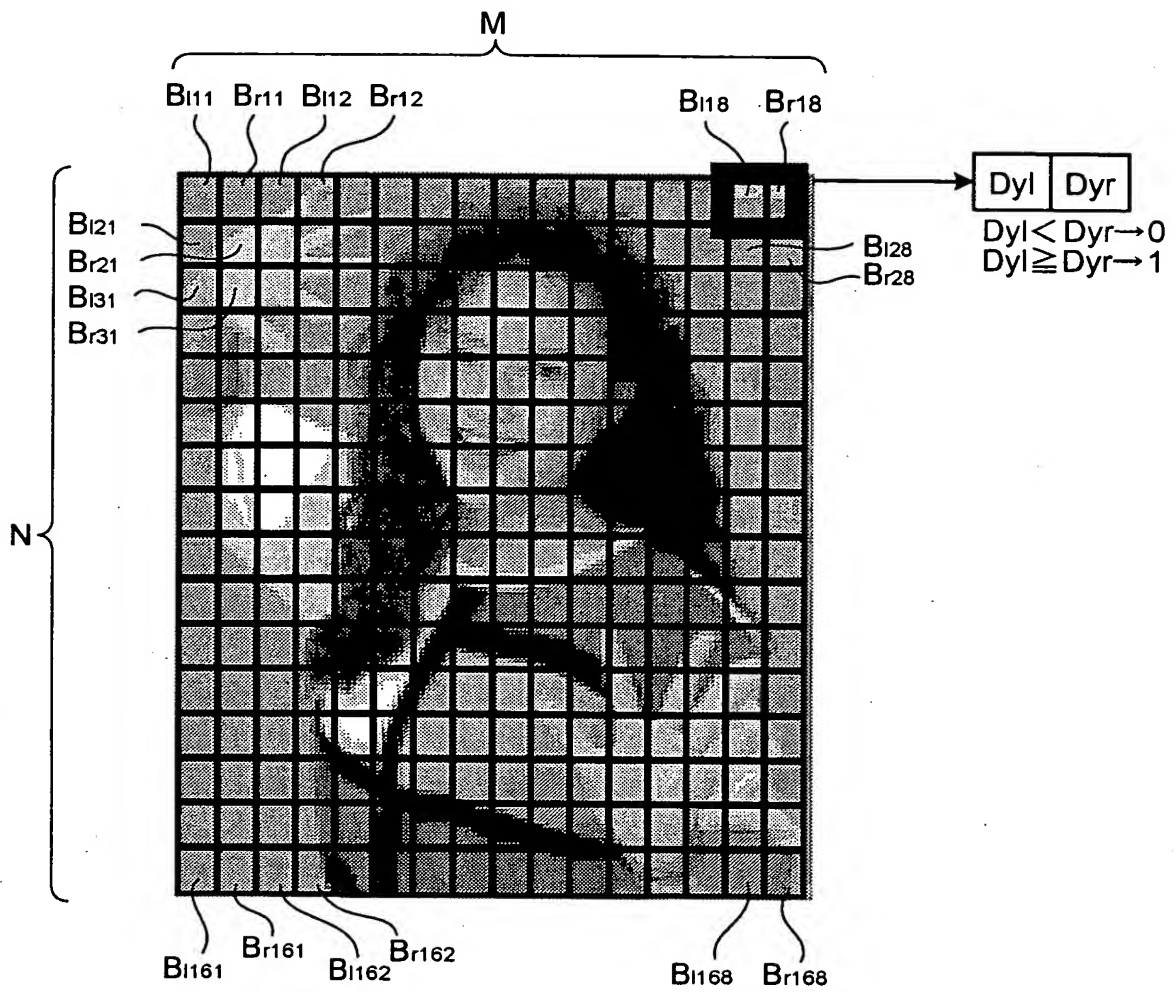
FIG.7

(A) WHEN Dyl<Dyr

$$D'yl=(Dyl+Dyr)/2-T/2 \quad \cdots (1)$$
$$D'yr=(Dyl+Dyr)/2+T/2 \quad \cdots (2)$$

(B) WHEN Dyl≧Dyr

$$D'yl=(Dyl+Dyr)/2+T/2 \quad \cdots (3)$$
$$D'yr=(Dyl+Dyr)/2-T/2 \quad \cdots (4)$$

D'yl   CHANGED YELLOW LEFT-SIDE MEAN PIXEL VALUE DATA
D'yr   CHANGED YELLOW RIGHT-SIDE MEAN PIXEL VALUE DATA
Dyl   YELLOW LEFT-SIDE MEAN PIXEL VALUE DATA BEFORE CHANGE
Dyr   YELLOW RIGHT-SIDE MEAN PIXEL VALUE DATA BEFORE CHANGE
T   DIFFERENCE SET FOR EACH BLOCK

FIG.8

(A)WHEN D'yl<D'yr AND Dml<Dmr
OR
WHEN D'yl≥D'yr AND Dml>Dmr
T＝TO
＝10   ···(5)
(B)WHEN D'yl≧D'yr AND Dml≧Dmr
OR
WHEN D'yl≦D'yr AND Dml≦Dmr
T = TO × (COEFFICIENT)
···(6)

FIG.9

108a

MAGENTA LEFT-SIDE MEAN PIXEL VALUE	COEFFICIENT
0 TO 25	3
26 TO 50	2
51 TO 200	1
201 TO 255	2

FIG.10A

START

SA1
SET CODE C

SA2
n = 1

SA3
INPUT ORIGINAL IMAGE DATA

SA4
DIVIDE IMAGE INTO BLOCKS

B

SA5
EXTRACT PAIRS OF BLOCKS

SA6
EXECUTE YELLOW PIXEL VALUE AVERAGING AND MAGENTA DENSITY AVERAGING

SA7
STORE DATA IN REGISTERS

SA8
EXECUTE BIT DETERMINATION FROM YELLOW PIXEL VALUE DIFFERENCE

A

FIG.10B

A

SA9

DOES
N-TH BIT OF CODE
C MATCH WITH BIT
DETERMINATION
RESULT?

No

Yes

SA15

IS
DENSITY
DIFFERENCE EQUAL
TO OR LESS THAN UPPER
LIMIT THRESHOLD
?

No

Yes

SA10

EXECUTE PIXEL
VALUE DIFFERENCE
CHANGE PROCESS

SA16

EXECUTE PIXEL
VALUE INVERSION
PROCESS

SA11

$n = n + 1$

SA12

$n > nend$?

No

Yes

SA13

FINAL BLOCK ?

No

Yes

SA14

OUTPUT CODED
IMAGE DATA

SA17

$n = 1$

END

B

FIG.11

I2;CODED IMAGE DATA

DECODER 200

IMAGE CUTOUT SECTION 201

BLOCK DIVISION SECTION 202

BLOCK EXTRACTION SECTION 203

AVERAGING SECTION 204

L REGISTER 205l

R REGISTER 205r

COMPARISON SECTION 206

DECODING SECTION 207

C;CODE

FIG.12

CG

```
1010110101001010      C₁
0011111101211010      C₂
1110110101000010
1012100101001010
2010110101001010
1010110101001010
0000110101001210
1010112101001000      C₈
```

(AFTER MAKING DECISION BY MAJORITY)

C'
```
1010110101001010
```

0:0
1:1
2:UNDEFINED

FIG.13

START

INPUT CODED IMAGE DATA I2 — SB1

n=1 — SB2

EXECUTE IMAGE CUTOUT PROCESS — SB3

DIVIDE IMAGE INTO BLOCKS — SB4

EXTRACT PAIRS OF BLOCKS — SB5

EXECUTE AVERAGING PROCESS — SB6

STORE DATA IN REGISTERS — SB7

EXECUTE BIT DETERMINATION — SB8

n=n+1 — SB9

n > nend ? — SB10 No

Yes

FINAL BLOCK? — SB11 No

Yes

DECIDE CODE MAJORITY — SB12

n=1 — SB14

OUTPUT CODE C' — SB13

END

FIG.14

ENCODER 300

I0;ORIGINAL IMAGE DATA

BLOCK DIVISION SECTION 101

I1

BLOCK EXTRACTION SECTION 102

YELLOW AVERAGING SECTION 103

MAGENTA AVERAGING SECTION 105

Dy

Dm

Dyl

Dyr

L REGISTER / R REGISTER 104l 104r

DENSITY DIFFERENCE CAICULATION SECTION 301

Dml

Dmr

Dmd

L REGISTER 106l / R REGISTER 106r / D REGISTER 302

COMPARISON SECTION 107

C;CODE (101011010100101010)

COEFFICIENT REGISTRATION SECTION 303

ENCODING SECTION 304

I2;CODED IMAGE DATA
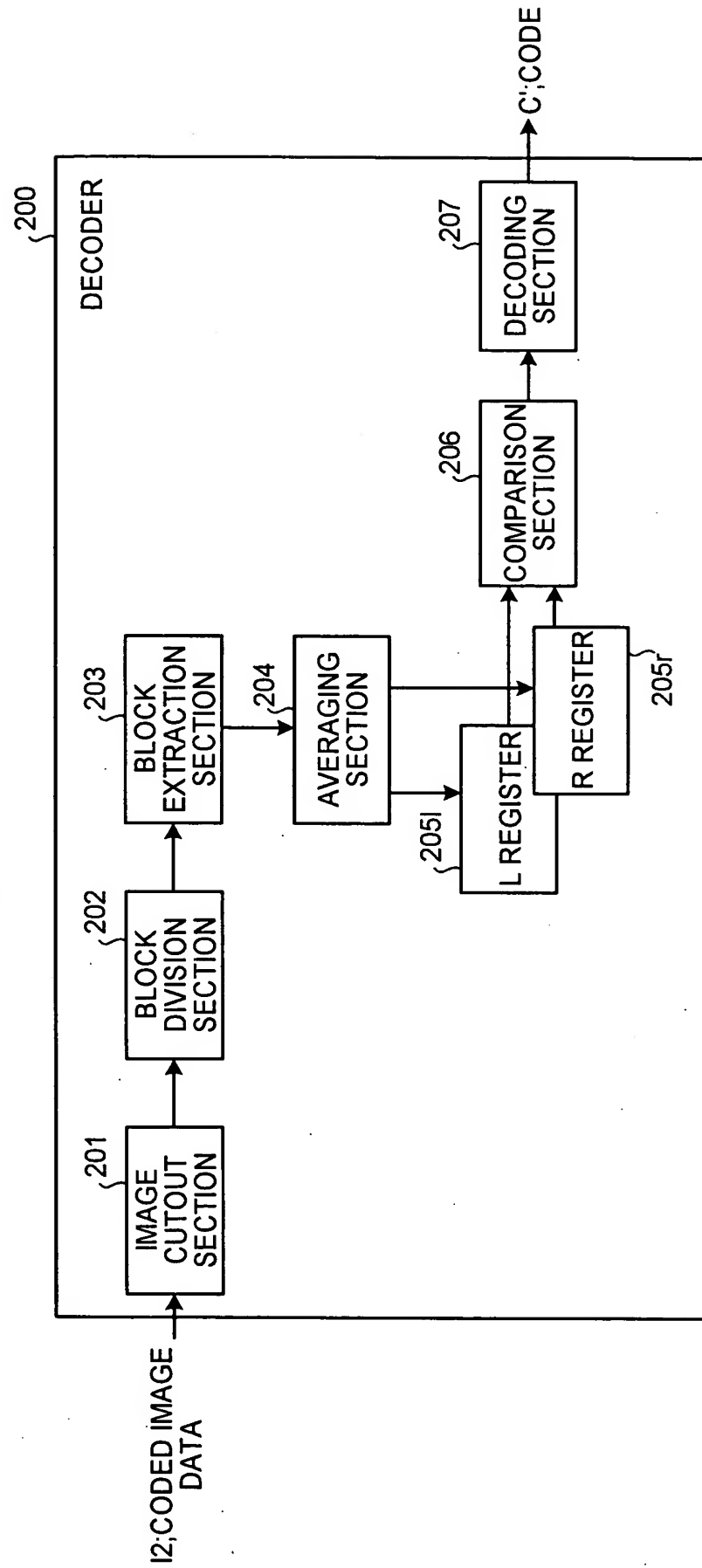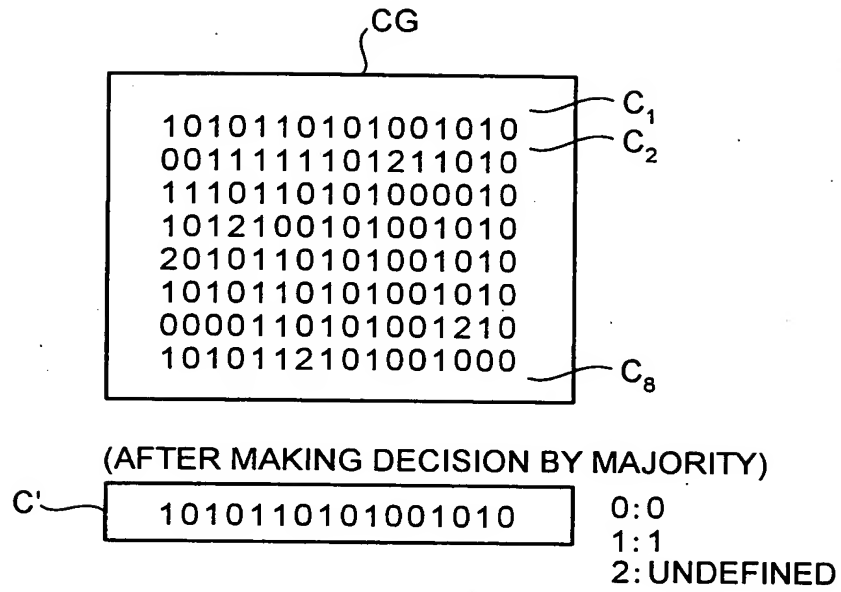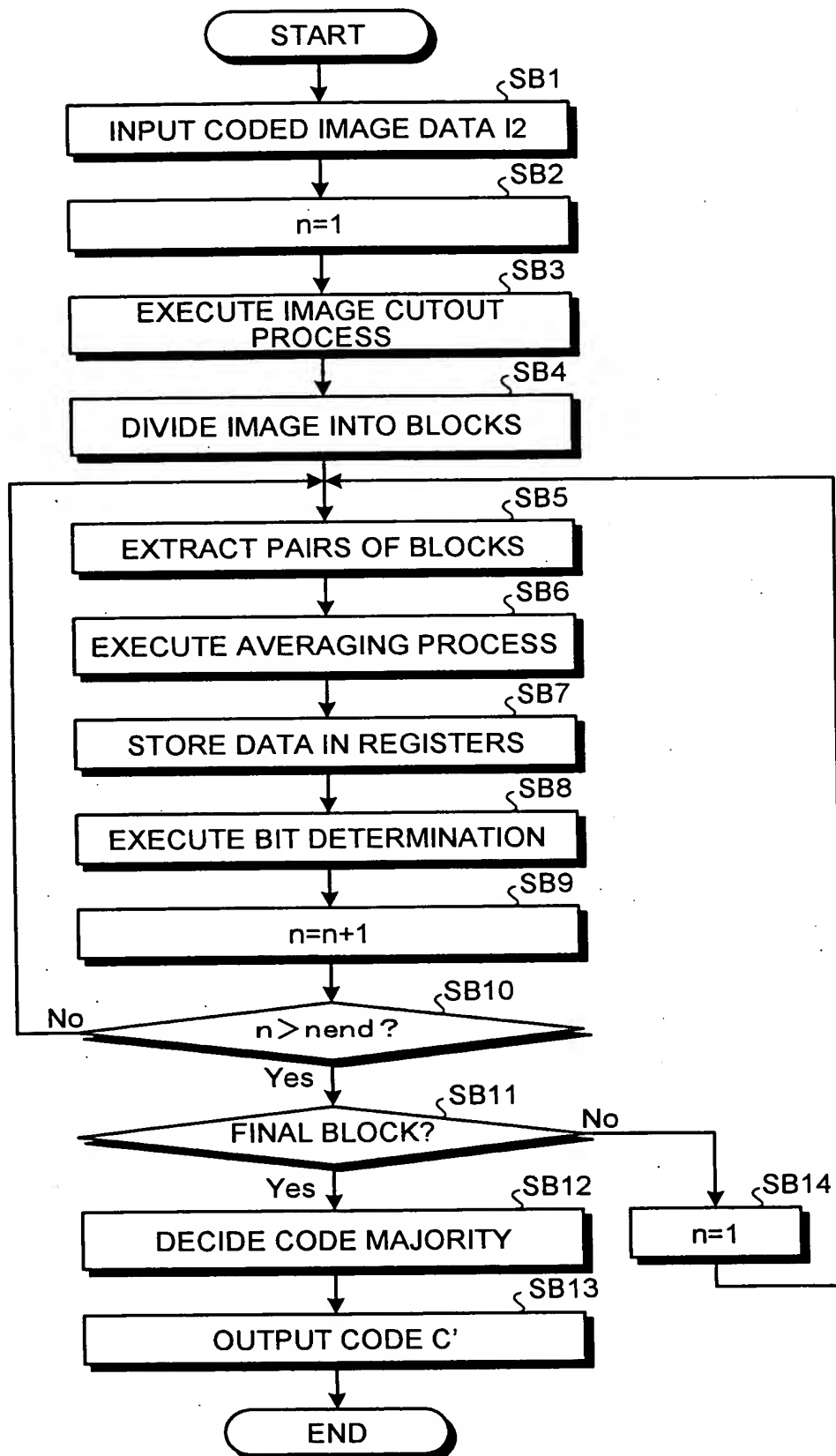
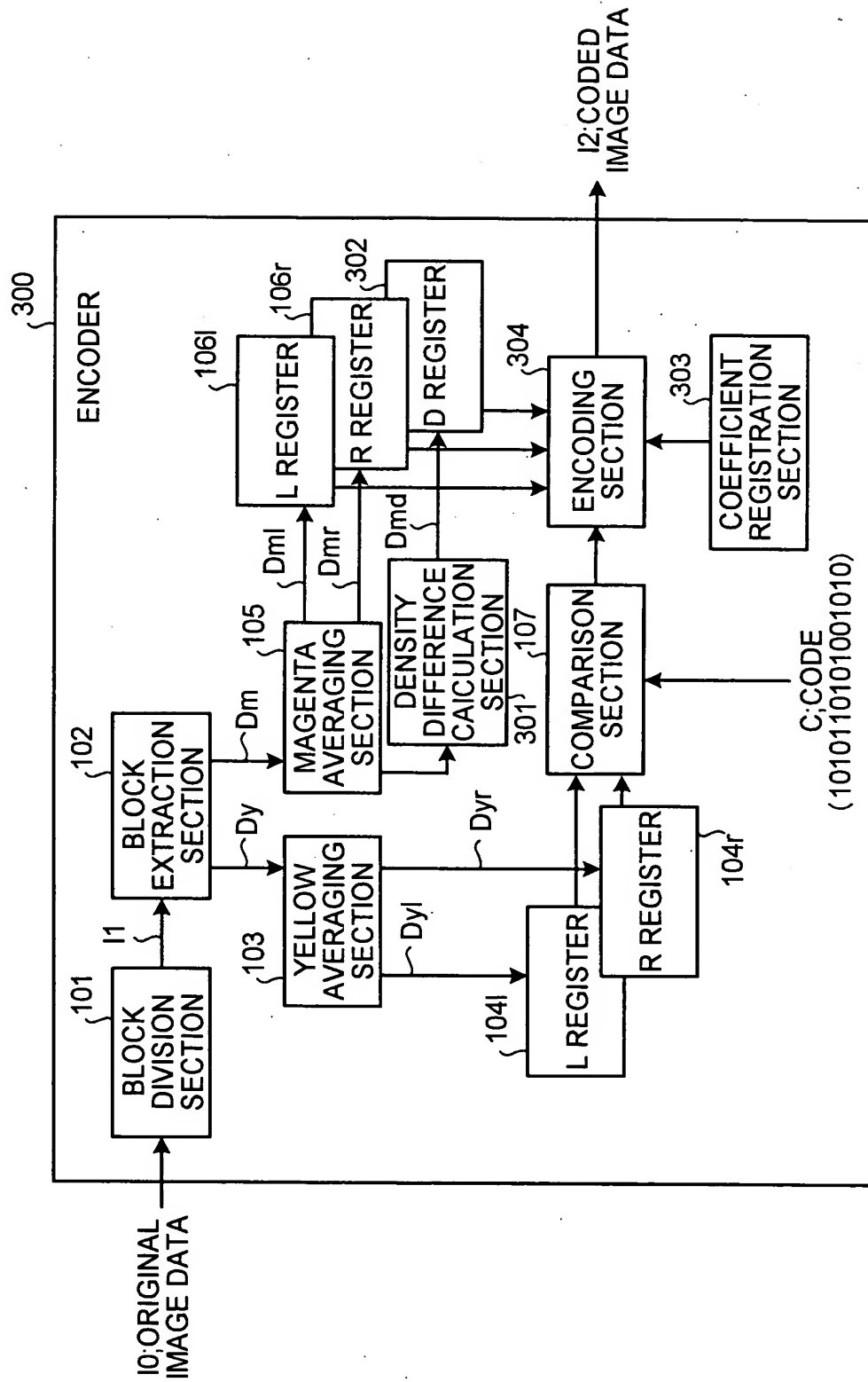# FIG.15

303a

LOW-PIXEL VALUE-SIDE MAGENTA MEAN DENSITY	MAGENTA MEAN PIXEL VALUE DIFFERENCE			
	0 TO 10	11 TO 20	21 TO 40	41 TO 255
0 TO 25	1	2	3	5
26 TO 50	1	1	2	3
51 TO 200	1	1	1	1
201 TO 255	1	2	3	3

FIG.16A

START

SC1
SET CODE C

SC2
n = 1

SC3
INPUT ORIGINAL IMAGE DATA

SC4
DIVIDE IMAGE INTO BLOCKS

B

SC5
EXTRACT PAIRS OF BLOCKS

SC6
EXECUTE YELLOW PIXEL VALUE AVERAGING AND MAGENTA DENSITY AVERAGING

SC7
CALCULATE MAGENTA MEAN PIXEL VALUE DIFFERENCE

SC8
STORE DATA IN REGISTERS

SC9
EXECUTE BIT DETERMINATION FROM YELLOW PIXEL VALUE DIFFERENCE

A

FIG.16B

(A)

SC10

DOES
N-TH BIT OF
CODE C MATCH BIT
DETERMINATION
RESULT?

No →

Yes ↓

SC11

EXECUTE PIXEL VALUE
DIFFERENCE CHANGE
PROCESS

SC16

IS
DENSITY
DIFFERENCE EQUAL TO
OR LESS THAN UPPER
LIMIT THRESHOLD
?

No →

Yes ↓

SC17

EXECUTE PIXEL VALUE
INVERSION PROCESS

SC12

$n = n + 1$

SC13

$n > nend$?

No →

Yes ↓

SC14

FINAL BLOCK ?

No →

Yes ↓

SC15

OUTPUT CODED IMAGE
DATA

SC18

$n = 1$

END

(B)

FIG.17

500

400

COMPUTER

410
CPU

450
READING DEVICE

420
INPUT DEVICE

460
OUTPUT DEVICE

430
ROM

440
RAM